

Work Order ID 81922

March 21, 2012 8:09:45 AM

81922

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Item ID: D6104-005 Accept *N900040100* Setup Start *NS1*
 Revision ID: Stop *NS2*
 Item Name: Round Billet, 17-4
 Start Date: 3/21/12 Start Qty: 30.00 *20*
 Required Date: 4/05/12 Req'd Qty: 30.00 *30*
 Reference: Cust Item ID:
 Customer:

Approvals: Process Plan: CL Date: 12/03/21 Tooling: _____ Date: _____
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____
 Run Start *NR1*
 Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D6104	Rev B								

100 PURCHASING 0.00
 100
 Purchasing Memo 0.00
 Purchasing Issue P/O: 16517 a) Description: S.S round billet b) Ø4.00" x 5.10" long c) Tolerance on all dimensions are +0.030"/-0.000" d) Material: 17-4PH Stainless steel (Ams 5643 or Aisi 630) e) One blank makes 2 parts f) Material certification required

110 Receive & Inspect for Damage & Mat'l Certs 0.00
 110
 Packaging Memo 0.00
 Packaging Ensure material certification is attached

120 QC6- Inspect dimensions to drawing 0.00
 120
 QC Memo 0.00
 Quality Control Ensure Material certification comply to Dwg D6104

CL 12/03/21 20

CL 4/23/26 (20)

CL 12/03/27 20

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 81922

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Item ID: D6104-005 Accept ***N900040100*** Setup Start ***NS1***
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 Item Name: Round Billet, 17-4
 Start Date: 3/21/12 Start Qty: 30.00 ***30*** Cust Item ID:
 Required Date: 4/05/12 Req'd Qty: 30.00 ***30*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Identify as per dwg & Stock Location: <u>MAT 43</u>	0.00							
130									
Packaging	Memo	0.00							
Packaging									
140	QC21- Final Inspection - Work Order Release	0.00							
140									
QC	Memo	0.00							
Quality Control									

OK 12/03/27

20

8

MCU 12/03/27

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

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Work Order ID: 81922

Parent Item: D6104-005

Parent Item Name: Round Billet, 17-4

Start Date: 3/21/12

Required Date: 4/05/12

Start Qty: 30.00

Required Qty: 30.00

Comments: IPP A: 01.05.08New Issue EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6104-005P 17-4 SS Roundbar 4.00"OD		Purchased	No			110	Each	0.0000	1	30			

0123/26 (20)

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

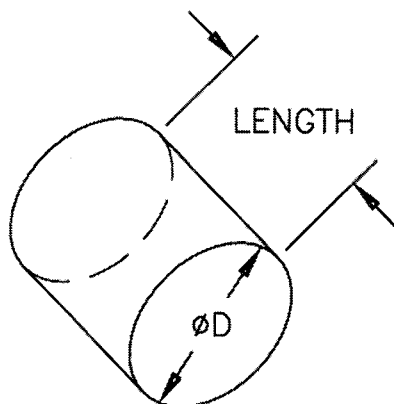


DESIGN <i>[Signature]</i>	DRAWN BY <i>[Signature]</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D6104	Rev. B SHEET 1 OF 1
DATE 02.11.25		TITLE ROUND BILLET, 17-4	SCALE NTS
A	01.04.10	NEW ISSUE	
B	02.11.25	CLARIFY ALLOY SPEC ADDED D6104-009/-011 REDUCE LENGTH OF BILLETS	

RELEASED

02.11.29 *[Signature]*

SPECIFICATION CONTROL DRAWING



CL 12/03/21

W/O: 81922

MATERIAL: 17-4 PH SS (AMS 5643 OR AISI 630) MIN UTS = 170 KSI (38 HRC)

PURCHASE MATERIAL ACCORDING TO THE FOLLOWING TABLE. SPECIFY ALLOY, DIAMETER x LENGTH (+0.030/-0.000) AS SHOWN.

TOLERANCE ON ALL DIMENSIONS IS +0.030/-0.000.

ALL DIMENSIONS ARE IN INCHES

Part No.	Alloy	D (Diameter)	Length
D6104-001	17-4 PH STAINLESS STEEL	Ø3.00	3.80
D6104-003	17-4 PH STAINLESS STEEL	Ø3.25	3.80
D6104-005	17-4 PH STAINLESS STEEL	Ø4.00	5.10
D6104-007	17-4 PH STAINLESS STEEL	Ø4.50	5.10
D6104-009	17-4 PH STAINLESS STEEL	Ø5.25	4.10
D6104-011	17-4 PH STAINLESS STEEL	Ø6.50	4.10

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**Castle Metals®**

A. M. Castle & Co.

BORDEREAU DE MARCHANDISES

Page 1 of 2

No de Formulaire d'Emballage / Shipment No:1243334

Expédié de / Ship From: A. M. Castle & Co. (Canada) Inc. MONTREAL 835-SELKIRK AVENUE POINTE CLAIRE, QUEBEC H9R 3S2		Vendu à / Sold To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA		Expédié à / Ship To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CAN		Livré à / Deliver To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA	
Date d'expédition / Date Shipped	F.O.B.	Modalités de transport / Freight Terms		Transporteur / Carrier		No du Bon de connaissance / BOL No	
23-MAR-2012	ORIGIN	Prepaid		MANITOULIN		1243334-2	

Détails d'expédition / Shipment Details	Destination finale / Final Destination Branch - MON
--	--

N° de commande / Order No 2086611	N° de ligne / Line No 1	N° d'article / Item No 42464.MO	Description 4.0000.RD.17CR-4NI.STAINLESS.RT.SOL TR.COND A.132.0000-156.0000 CUT TO 5.1 IN (+ .0620/- .0000 IN) - BAND SAW CUTTING SPECIFICATIONS: AMS 5643
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N° de bon de commande / Purchase Order No 16517	Nbre de pièces / Part Number YOUR ITEM NUMBER: D6104-005	Qté commandée / Ordered Qty 20.00 PCS	Qté Facturée / Invoice Qty 20.0000 PCS
---	---	---	--

Détails / Details		SHIP AS SOON AS POSSIBLE					
N° de livraison / Delivery No : 117482732	Usine / Mill OUTOKUMPU STAINLESS INC.	No de coulée / Heat Number 527171	Code méc / Mech Id	Pièces / PCS 20	Largeur (Pouce) / Width (IN)	Longueur (Pouce) / Length (IN)	Qté expédiée / Shipped Qty(LBS) 374.58

Ces marchandises/technologies sont sujettes aux règlements de l'Export Administration et du département d'Etat des Etats-Unis. Si elles ont été/sont exportées, elles doivent se conformer à ces règlements. Toute modification du contrat de transport contraire aux lois des Etats-Unis est interdite.

These commodities/technologies are subject to US Export Administration & US State Dept. Regulations and, if intended for export, were/are exported thereunder. Diversion contrary to US Law is Prohibited.

Nous certifions par la présente que le matériel couvert par cette certification est conforme aux spécifications susmentionnées et aux exigences applicables pour le matériel, y compris toute spécification faisant partie de la description. Les rapports d'essai sont archivés pour fins de consultation. Toute requête concernant du matériel défectueux sera rejetée à moins qu'elle ne soit faite par écrit à A. M. Castle & Co. dans les 60 jours suivant la livraison. Le matériel coupé sur mesure ou coupé par le client ne peut être retourné pour crédit.

We hereby certify the material covered by this certification conforms in accordance with the above specifications and has been found to meet the applicable requirements for the material, including any specifications forming a part of the description.

These commodities, technology or software were exported from the United States in accordance with the Export Administration Regulations. Diversion contrary to US law prohibited.

Date Printed: 23-MAR-2012 01:19:36 PM



Castle Metals®

A. M. Castle & Co.

BORDEREAU DE MARCHANDISES

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Test reports are on file subject to examination. All claims for defective material are waived for credit.			Unless made in writing to A.M. Castle & Co. within 60 days of the shipment. Material cut to the correct size, or material cut by the customer cannot be returned		
Ce matériel a été reçu et inspecté par		Date:		Name:	
Reviewed by Authorized Castle Metals Representative:					



Certificate of Test

HRAT 527171

ORDER 618791/ 01 BOL 0211742 * CERTIFICATION * 04/26/11

SHIP TO:
A. M. CASTLE METALS
3400 NORTH WOLF ROAD

FRANKLIN PARK 601310000

86083

YOUR ORDER & DATE
4/26/11 CUST# 0254001 CUST TAG#42464

GRADE 17-4
Size 17-4 RND HRART CONDA 4.0000 x 144.000 RL
Country of Melt: SWEDEN
ITEM DESCRIPTION
Ship Condition CONDA
Country of Mfg.: UNITED STATES
NAFTA Country of Origin is Country of Melt

No weld repair
Free of mercury contamination, Free of radiation contamination
No WEEE relevant substances; Meets EU electrical ROHS

Total Bundles 1 Total Weight 1005

WO 2016767 Bundles: 1A

SPECIFICATIONS
MEC-TO FINISHED BAR IN THE USA FROM BILLETS IMPORTED SWEDEN
AMS 2303F
ASME SA182 E07, A07-09, E10
ASTM A484 09
DFARS 252.225.7014 6/05
UNS S17400, AISI 630
Free of Mercury Contaminatio
H900 capability sample aged at 900F/1hr/AC then tensile and HRC tested

MECHANICAL & OTHER TESTS
Hardness as shipped 279 HB
Hardness as shipped 029 HRC
Grain size 6.0
Micro OK
Intergranular corrosion OK
Macro OK
Ferrite 0
Hardness as tested 409 HB
Hardness as tested (44 HRC)
Tensile strength, KSI (MPa) 200.0 (1379)
0.2% Yield Strngth, KSI (MPa) 180.0 (1241)
Elongation % in 4D 12.0
Reduction of area % 42.0

CHEMICAL COMPOSITION
Carbon (C) .010
Phosphorus (P) .025
Silicon (Si) .360
Nickel (Ni) 4.680
Copper (Cu) 3.420
Nitrogen (N) .021
Titanium (Ti) .005
Tin (Sn) .006
Boron (B) .001
Vanadium (V) .036
Columbium/ Tantalum (Cb+Ta) .235
Iron (Fe) Balance
Frequency .000
Melt Practice EAF
Refining Practice AOD
De-long Ferrite
Manganese (Mn) .710
Sulphur (S) .025
Chromium (Cr) 15.320
Cobalt (Co) .036
Moly (Mo) .170
Columbium (Cb) .230
Aluminum (Al) .003
Cerium (Ce) .010
Tantalum (Ta) .005
Severity .000

Knowingly & willfully falsifying or concealing a material act on this form, or making false, fictitious or fraudulent statements or representations herein could constitute a felony punishable under federal statutes. We hereby certify that the test results shown in this report are correct and accurate as contained in the records of the company and are in compliance with the specifications, codes, and standards listed above.

M.F. Marcanio, Quality Manager

M.F. Marcanio

Castle Metals FP
527171
HEAT NUMBER
MECHANICAL ID
ITEM CODE
42464
LOT NUMBER
86083
PO NUMBER
4-28-2011
RECEIPT DATE
OUTOKUMBI
SUPPLIER
SPECIFICATION
LCS
COMMENT
APPROVED